



Recommendations for the Use of Antiretroviral Drugs in Pregnant Women with HIV Infection and Interventions to Reduce Perinatal HIV Transmission in the United States

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Preconception Counseling and Care for Women of Childbearing Age Living with HIV (Last updated December 24, 2019; last reviewed December 24, 2019)

Panel's Recommendations

- Discuss reproductive desires with all women of childbearing age on an ongoing basis throughout the course of their care (AIII).
- Provide information about effective and appropriate contraceptive methods to reduce the likelihood of unplanned pregnancy (AI).
- During preconception counseling, provide information on safe sex and encourage the elimination of alcohol, tobacco, and other drugs of abuse; if elimination is not feasible, clinicians should provide appropriate treatment (e.g., methadone or buprenorphine) or counsel patients on how to manage health risks (e.g., use of a syringe services program) (AII).
- Women with HIV should attain maximum viral suppression before attempting conception for their own health, to prevent sexual HIV transmission to partners without HIV (AI), and to minimize the risk of perinatal HIV transmission to the infant (AI).
- When selecting or evaluating an antiretroviral (ARV) regimen for women of childbearing age with HIV, consider a regimen's effectiveness, a woman's hepatitis B status, the teratogenic potential of the drugs in the ARV regimen, and the possible adverse outcomes for the mother and fetus (AII). See [Teratogenicity and Recommendations for Use of Antiretroviral Drugs During Pregnancy](#) for more information. The Panel on Treatment of Pregnant Women with HIV Infection and Prevention of Perinatal Transmission emphasizes the importance of counseling and informed decision-making regarding all ARV regimens for people with HIV (AIII).
- HIV infection does not preclude the use of any contraceptive method; however, drug-drug interactions between hormonal contraceptives and antiretrovirals should be considered (AII).

Rating of Recommendations: A = Strong; B = Moderate; C = Optional

Rating of Evidence: I = One or more randomized trials with clinical outcomes and/or validated laboratory endpoints; II = One or more well-designed, nonrandomized trials or observational cohort studies with long-term clinical outcomes; III = Expert opinion

Overview

The Centers for Disease Control and Prevention (CDC), the American College of Obstetricians and Gynecologists (ACOG), and other national organizations recommend offering all women of childbearing age comprehensive family planning and the opportunity to receive preconception counseling and care as a component of routine primary medical care. The purpose of preconception care is to improve the health of each woman before conception by identifying risk factors for adverse maternal or fetal outcomes, tailoring education and counseling to patients' individual needs, and treating or stabilizing medical conditions to optimize maternal and fetal outcomes.¹ Preconception care is not something that occurs in a single clinical visit; rather, it requires integrating ongoing care and interventions into primary care to address the needs of women during the different stages of reproductive life. It is important that comprehensive family planning and preconception care be integrated into routine health care visits, because almost half of all pregnancies in the United States are unplanned.²⁻¹² Providers should initiate and document a nonjudgmental conversation with all women of reproductive age about their reproductive desires, because women may be reluctant to bring this up themselves.¹³⁻¹⁷ Health care providers who routinely care for women of reproductive age who are living with HIV play an important role in promoting preconception health and informed reproductive decisions. However, even among providers who offer primary care to women with HIV, the delivery of comprehensive reproductive counseling often falls short of the current guidelines.^{18,19}

The fundamental principles of preconception counseling and care are outlined in the CDC Preconception Care Work Group's [Recommendations to Improve Preconception Health and Health Care](#). In addition to the general components of preconception counseling and care that are appropriate for all women of reproductive age, women with HIV have specific needs that should be addressed.²⁰⁻²³ Health care providers should:

- Discuss reproductive options, actively assess women's pregnancy intentions on an ongoing basis throughout the course of care, and, when appropriate, make referrals to experts in HIV and women's health, including experts in reproductive endocrinology and infertility when necessary.^{13,24}

- The primary treatment goal for women who are on antiretroviral therapy (ART) and planning a pregnancy should be sustained suppression of plasma viral load below the limit of detection prior to conception. This is important for the health of the woman, and it minimizes the risk of perinatal HIV transmission and prevents sexual HIV transmission to a partner without HIV (see [Reproductive Options for Couples When One or Both Partners are Living with HIV](#)).
- People with HIV who take ART as prescribed and who achieve and maintain an undetectable viral load have effectively no risk of transmitting HIV through sex. This is commonly known as Undetectable = Untransmittable or U=U. For more information, see the [Prevention IS Care Resources](#) from CDC.
- Encourage sexual partners to receive HIV counseling and testing so that they can seek HIV care if they have HIV or seek advice about oral pre-exposure prophylaxis (PrEP), if appropriate, and other measures to prevent HIV acquisition if they do not have HIV.
- Counsel women on eliminating the use of alcohol, tobacco, and other drugs of abuse. The use of these drugs should be appropriately treated (e.g., with methadone or buprenorphine) and managed (e.g., provide access to syringe services program) when elimination is not feasible.
- Counsel women who are contemplating pregnancy to take a daily multivitamin that contains 400 mcg of folic acid to help prevent certain birth defects. Women who are at higher risk of having a child with neural tube defects (NTDs) than the baseline population are candidates for receiving a higher dose (1 to 4 mg) of folic acid.
- Educate and counsel women about the risk factors for perinatal HIV transmission, the strategies to reduce those risks, and the potential effects of HIV or of taking antiretroviral (ARV) drugs during pregnancy on pregnancy course and outcomes. Education and counseling should also be directed at helping women to understand the recommendation that women living with HIV in the United States not breastfeed because of the risk of transmission of HIV to their infants and the availability of safe and sustainable infant feeding alternatives.
- To support women's informed decision-making about ART, clinicians should educate and counsel them about the factors that affect the selection of ARV drugs for women who are trying to conceive, pregnant women, or postpartum women. This includes discussing the small but significant increase in the risk of infant NTDs when dolutegravir (DTG) is taken around the time of conception with women who are currently receiving DTG as part of their ART regimen or women who wish to be started on DTG. For more information, see [Teratogenicity](#), [Updated Guidance about the Use of Dolutegravir in Pregnancy](#) in [Recommendations for Use of Antiretroviral Drugs During Pregnancy](#), [Dolutegravir](#), and [Appendix D: Dolutegravir Counseling Guide for Health Care Providers](#).
- When prescribing ART to women of childbearing age, consider the regimen's effectiveness, an individual's hepatitis B virus (HBV) status, the potential for teratogenicity, the [likelihood of developing drug resistance](#), and the possible adverse outcomes for mother and fetus.²⁵⁻²⁷
- Use the preconception period to modify the ARV regimen of women who are contemplating pregnancy to optimize virologic suppression and minimize potential adverse effects (see [Recommendations for Use of Antiretroviral Drugs During Pregnancy](#) and [Table 7](#)).
- Recognize that women with perinatally acquired HIV may have special needs²⁸ (see [Prenatal Care, Antiretroviral Therapy, and HIV Management in Women with Perinatal HIV Infection](#)).
- Evaluate and manage therapy-associated side effects (e.g., hyperglycemia, anemia, hepatotoxicity) that may adversely impact maternal-fetal health outcomes.
- Administer all vaccines as indicated (see [Guidance for Vaccine Recommendations for Pregnant and Breastfeeding Women](#) and [2013 IDSA Clinical Practice Guideline for Vaccination of the](#)

[Immunocompromised Host](#)). This includes vaccines for influenza, pneumococcus, HBV, and tetanus. All women, including those with HIV, should receive Tdap vaccination during each pregnancy.

- Offer all women who do not currently desire pregnancy effective and appropriate contraceptive methods to reduce the likelihood of unintended pregnancy. Women with HIV can use all available contraceptive methods, including hormonal contraception (e.g., pill, patch, ring, injection, implant) and intrauterine devices (IUDs).²⁹ Providers should be aware of potential interactions between ARV drugs and hormonal contraceptives that could lower contraceptive efficacy (see Table 3 below).
- Offer emergency contraception as appropriate, including emergency contraceptive pills and the copper IUD (see the [ACOG Practice Bulletin on emergency contraception](#)). Emergency contraceptive pills that contain estrogen and a progestin and those that only contain levonorgestrel may have interactions with ARV drugs that are similar to the ones observed with combined oral contraceptives.³⁰ There are no data on potential interactions between ARV drugs and ulipristal acetate, a progesterone receptor modulator; however, ulipristal acetate is predominantly metabolized by cytochrome P450 (CYP) 3A4, so interactions may occur (see the [HIV Drug Interaction Checker](#)).
- Optimize the woman's health prior to conception (e.g., ensure appropriate folate intake, test for **all** sexually transmitted infections and treat as indicated, consider the teratogenic potential of **all** prescribed medications, and consider switching to safer medications).

Drug-Drug Interactions Between Hormonal Contraceptives and Antiretroviral Therapy

Data on drug interactions between ARV drugs and hormonal contraceptives primarily come from drug labels and limited studies.³⁰⁻⁴⁷ The contraceptive effectiveness of the levonorgestrel IUD is largely through local (i.e., intrauterine) release of levonorgestrel, not through systemic absorption. The [CDC's U.S. Medical Eligibility Criteria for Contraceptive Use](#) lists the levonorgestrel IUD as category 1 (no restrictions) in drug interactions with all ARV drugs in women who already have an IUD and category 1/2 (benefits outweigh risk) for those who are initiating use of an IUD.

Hormonal contraceptives can be used with ARV drugs in women without other contraindications. Additional or alternative methods of contraception may be recommended when drug interactions are known. For women who are using ritonavir (RTV)-boosted protease inhibitors (PIs) and who are also on combination hormonal contraceptives (e.g., pills, patches, rings) or progestin-only pills, use of an alternative or additional method of contraception may be considered, since the area under the curve of hormones may be decreased with the use of some RTV-boosted PIs (i.e., darunavir/ritonavir [DRV/r], fosamprenavir/ritonavir, and lopinavir/ritonavir [LPV/r]) but not others (see Table 3). Depot medroxyprogesterone acetate (DMPA) can be used without restriction because of its relatively higher dose than other progesterone-based contraception, and limited studies have shown no significant interaction between DMPA and ARV drugs.^{32,34,44,48} Doses of hormonal contraceptives do not need to be adjusted in patients who are receiving nucleoside reverse transcriptase inhibitors.

While contraceptive implants (e.g., etonogestrel/levonorgestrel) generally can be used in women who are receiving ARV drugs, both pharmacokinetic (PK) and clinical data suggest that these implants have decreased efficacy when used with efavirenz (EFV)-based regimens.^{42,49-51} Scarsi et al. reported on three groups of Ugandan women with HIV: those who were not on ART (17 women), those taking nevirapine (NVP)-based ART (20 women), and those taking EFV-based ART (20 women) who had levonorgestrel implants placed and had levonorgestrel PK levels assessed at 1, 4, 12, 24, 36, and 48 weeks post-insertion. The geometric mean ratio of levonorgestrel concentrations (patients taking EFV-based ART vs. ART-naïve patients) was 0.53 at 24 weeks and 0.43 at 48 weeks. Three pregnancies occurred in the EFV group (15%) between weeks 36 and 48, whereas no pregnancies occurred in the ART-naïve or NVP groups.⁴⁶

In a study of 570 women with HIV in Swaziland who had levonorgestrel implants (i.e., Jadelle), none of the women on NVP- or LPV/r-based regimens (n = 208 and n = 13, respectively) became pregnant, whereas 15 women on EFV (n = 121; 12.4%) became pregnant.⁴² Because of their overall efficacy, implants remain as

effective as or more effective than oral and injectable contraceptives among women with HIV who are using EFV, and all hormonal contraceptives remain more effective than no contraception among these women.^{50,52} A study collected data from 5,153 women with HIV who were followed prospectively for 1 to 3 years. During the follow-up period, 9% of the women used implants (mostly levonorgestrel), 40% used injectables, and 14% used oral contraceptives; 31% of these women took ART during the follow-up period, mostly NVP-containing (75%) or EFV-containing (15%) regimens. Among women who were not using contraception, pregnancy rates were 13.2 per 100 person-years for those who were on ART and 22.5 per 100 person-years for those who were not on ART. Implants greatly reduced the incidence of pregnancy among women on ART (adjusted hazard ratio [aHR] 0.06; 95% confidence interval [CI], 0.01–0.45) and women who were not on ART (aHR 0.05; 95% CI, 0.02–0.11). Injectables and oral contraceptives also reduced pregnancy risk, though to lesser degrees. ART use did not significantly diminish contraceptive effectiveness, although all methods showed nonstatistically significant reduced contraceptive effectiveness when a woman was using EFV concurrently.⁵²

Because data are limited on pregnancy rates among women on different hormonal contraceptives and ARV drugs, the dosing recommendations in Table 3 are based on consensus expert opinion. Whenever possible, the recommendations are based on available data regarding PK interactions between ARV drugs and combined hormonal methods, DMPA, and levonorgestrel and etonogestrel implants. The smallest decrease in PK for which an alternative method was recommended was a 14% decrease in norethindrone (with DRV/r). For women who are using atazanavir without RTV boosting (ethinyl estradiol increase 48%, norethindrone increase 110%), the Panel on Treatment of Pregnant Women with HIV Infection and Prevention of Perinatal Transmission (the Panel) recommends the use of oral contraceptives that contain ≤ 30 μg ethinyl estradiol. The Panel does not recommend any change in ethinyl estradiol dose in women who are receiving etravirine (ethinyl estradiol increase 22%), rilpivirine (ethinyl estradiol increase 14%), or indinavir (ethinyl estradiol increase 25%, norethindrone increase 26%).

Table 3. Drug Interactions Between Antiretroviral Agents and Hormonal Contraceptives (page 1 of 8)

Note: All recommendations in the following table are based on consensus expert opinion. More details can be found in the [CDC's U.S. Medical Eligibility Criteria for Contraceptive Use, 2016](#).

ARV Drug	Effect on Contraceptive Drug Levels and Contraceptive's Effects on ART and HIV	Clinical Studies	Dosing Recommendation/ Clinical Comment for COC/P/R	Dosing Recommendation/ Clinical Comment for POPs	Dosing Recommendation/ Clinical Comment for DMPA ^a	Dosing Recommendation/ Clinical Comment for Etonogestrel Implants	Justification/ Evidence for Recommendation
NNRTIs							
EFV	<p>COC:</p> <ul style="list-style-type: none"> No effect on EE concentrations ↓ active metabolites of norgestimate; LN AUC ↓ 83% and norelgestromin AUC ↓ 64%³⁵ Etonogestrel (in COC) C_{24h} ↓ 61%⁴¹ <p>DMPA:</p> <ul style="list-style-type: none"> No effect on DMPA levels^{32,34} <p>Etonogestrel Implant:</p> <ul style="list-style-type: none"> Etonogestrel AUC ↓ 63% to 82%^{51,53} <p>LN Implant:</p> <ul style="list-style-type: none"> LN AUC ↓ 47%⁴⁶ LN (emergency contraception) AUC ↓ 58%³⁰ <p>Changes in ARV Levels and/or Effects on HIV</p> <p>COC:</p> <ul style="list-style-type: none"> No effect on EFV concentrations³⁵ EFV C_{12h} ↓ 22%; was under therapeutic threshold in three of 16 subjects⁴¹ <p>DMPA:</p> <ul style="list-style-type: none"> No effect on HIV disease progression^{32,54,55} No effect on EFV concentrations³² <p>LN Implant:</p> <ul style="list-style-type: none"> No effect on HIV disease progression⁴⁶ <p>Vaginally Administered Etonogestrel/EE:</p> <ul style="list-style-type: none"> Etonogestrel ↓ 79% EE ↓ 59% 	<p>COC:</p> <ul style="list-style-type: none"> No difference in pregnancy rates⁵² Pregnancy rate was 13% higher in women using COCs and EFV than in women using COCs alone^{50,56} Progesterone >3 ng/mL (a surrogate for ovulation) in three of 16 women⁵⁷ No ovulations³⁵ <p>DMPA:</p> <ul style="list-style-type: none"> No increase in pregnancy rates^{32,50,52,55} Low progesterone^{32,34,55} <p>Etonogestrel Implant:</p> <ul style="list-style-type: none"> Pregnancy rate higher with EFV compared with no ART, but still lower with implants than with other hormonal methods of contraception⁵⁰ Presumptive ovulation in 5%⁵³ <p>LN Implant:</p> <ul style="list-style-type: none"> 12% pregnancy rate⁴² 15% pregnancy rate⁴⁶ Pregnancy rate higher with EFV compared with no ART, but still lower with implants than with other hormonal methods of contraception⁵⁰ No increase in pregnancy rate⁵² 	Consider an alternative method (or a reliable method of barrier contraception) in addition to this method.	Consider an alternative method (or a reliable method of barrier contraception) in addition to this method.	No additional contraceptive protection is needed.	Consider an alternative method (or a reliable method of barrier contraception) in addition to this method.	<p>For COCs, some studies suggest higher pregnancy rate and ovulation rate and decreased progestin levels. EFV may decrease, but clinical significance unclear.</p> <p>For DMPA, evidence does not show effects on pregnancy rate, ovulation, or DMPA levels. Also, no effect on HIV disease progression or EFV levels.</p> <p>For implants, some studies suggest higher pregnancy rate and decreased hormone levels.</p> <p>For vaginally administered etonogestrel/EE, PK evaluation showed that etonogestrel levels were 79% lower and EE levels were 59% lower in participants on EFV than in controls after 21 days.⁵⁸</p>

Table 3. Drug Interactions Between Antiretroviral Agents and Hormonal Contraceptives (page 2 of 8)

ARV Drug	Effect on Contraceptive Drug Levels and Contraceptive's Effects on ART and HIV	Clinical Studies	Dosing Recommendation/ Clinical Comment for COC/P/R	Dosing Recommendation/ Clinical Comment for POPs	Dosing Recommendation/ Clinical Comment for DMPA ^a	Dosing Recommendation/ Clinical Comment for Etonogestrel Implants	Justification/ Evidence for Recommendation
NNRTIs, continued							
ETR	EE AUC ↑ 22% ⁵⁹ No significant effect on NE ⁵⁹	COC: • No ovulations ⁵⁹	No additional contraceptive protection is needed.	No additional contraceptive protection is needed.	No additional contraceptive protection is needed.	No additional contraceptive protection is needed.	For COCs, one study found no ovulations and no significant change in progestin levels. No data on POPs.
NVP	EE AUC ↓ 29%; ⁶⁰ no change in EE AUC ⁶¹ NE AUC ↓ 18% ⁶⁰ Etonogestrel (in COC) C _{24h} ↓ 22% ⁴¹ DMPA: • No significant change ³² LN Implant: • LN AUC ↑ 35% ⁴⁶ Changes in ARV Levels and/or Effects on HIV COC: • No significant effect on NVP levels ^{57,60,62} DMPA: • No effect on HIV disease progression ^{32,54,55,63} LN Implant: • No effect on HIV disease progression ^{46,64}	COC: • No increase in pregnancy rate ^{50,52,56,65,66} • No ovulations ^{57,61,66} DMPA: • No increase in pregnancy rate ^{50,52,55,65} • No ovulations ³² Etonogestrel Implant: • No increase in pregnancy rate ⁵⁰ LN Implant: • No increase in pregnancy rate ^{42,46,50,52,64}	No additional contraceptive protection is needed.	No additional contraceptive protection is needed.	No additional contraceptive protection is needed.	No additional contraceptive protection is needed.	For COCs, evidence does not show effects on pregnancy rate or ovulations. Evidence demonstrated small decrease in progestin levels. No effect on NVP levels. For DMPA, evidence does not show effects on pregnancy rate, ovulation, or DMPA levels. No effect on HIV disease progression. For implants, evidence does not show effects on pregnancy rate or HIV disease progression.
RPV	EE AUC ↑ 14% ⁴⁰ No significant change on NE. ⁴⁰ Changes in ARV Levels and/or Effects on HIV COC: • No change in RPV levels compared to historical controls ⁴⁰	COC: • No change in progesterone ⁴⁰	No additional contraceptive protection is needed.	No additional contraceptive protection is needed.	No additional contraceptive protection is needed.	No additional contraceptive protection is needed.	For COCs, evidence does not show effects on ovulation or progestin levels. No change in RPV levels. No data on POPs.

Table 3. Drug Interactions Between Antiretroviral Agents and Hormonal Contraceptives (page 3 of 8)

ARV Drug	Effect on Contraceptive Drug Levels and Contraceptive's Effects on ART and HIV	Clinical Studies	Dosing Recommendation/ Clinical Comment for COC/P/R	Dosing Recommendation/ Clinical Comment for POPs	Dosing Recommendation/ Clinical Comment for DMPA ^a	Dosing Recommendation/ Clinical Comment for Etonogestrel Implants	Justification/ Evidence for Recommendation
NNRTIs, continued							
DOR	No clinically significant interaction with EE and LN	N/A	No additional contraceptive protection is needed.	No additional contraceptive protection is needed.	No additional contraceptive protection is needed.	No additional contraceptive protection is needed.	No clinical data.
RTV-Boosted PIs							
ATV/r	EE AUC ↓ 19% ⁶⁷ Norgestimate AUC ↑ 85% ⁶⁷ POP: • NE AUC ↑ 50% ⁶⁸ Vaginally Administered Etonogestrel/EE: • Etonogestrel ↑ 71% • EE ↓ 38% ⁵⁸	N/A	No additional contraceptive protection is needed.	No additional contraceptive protection is needed.	No additional contraceptive protection is needed.	No additional contraceptive protection is needed.	For COCs, increase in progestin levels seen in only one study. For POPs, increase in progestin levels seen in only one study. RTV inhibits CYP3A4, which may increase contraceptive hormone levels.
DRV/r	EE AUC ↓ 44% ⁶⁹ NE AUC ↓ 14% ⁶⁹	N/A	Can consider an alternative method (or a reliable method of barrier contraception) in addition to this method.	Can consider an alternative method (or a reliable method of barrier contraception) in addition to this method.	No additional contraceptive protection is needed.	Can consider an alternative method (or a reliable method of barrier contraception) in addition to this method.	For COCs, small decrease in progestin levels. No data on POPs.
FPV/r	EE AUC ↓ 37% ⁷⁰ NE AUC ↓ 34% ⁷⁰ No change in FPV/r levels ⁷⁰	N/A	Can consider an alternative method (or a reliable method of barrier contraception) in addition to this method.	Can consider an alternative method (or a reliable method of barrier contraception) in addition to this method.	No additional contraceptive protection is needed.	Can consider an alternative method (or a reliable method of barrier contraception) in addition to this method.	For COCs, decrease in progestin levels. No data on POPs.

Table 3. Drug Interactions Between Antiretroviral Agents and Hormonal Contraceptives (page 4 of 8)

ARV Drug	Effect on Contraceptive Drug Levels and Contraceptive's Effects on ART and HIV	Clinical Studies	Dosing Recommendation/ Clinical Comment for COC/P/R	Dosing Recommendation/ Clinical Comment for POPs	Dosing Recommendation/ Clinical Comment for DMPA ^a	Dosing Recommendation/ Clinical Comment for Etonogestrel Implants	Justification/ Evidence for Recommendation
RTV-Boosted PIs, continued							
LPV/r	<p>EE AUC ↓ 55%³¹</p> <p>NE AUC ↓ 17%</p> <p>Patch:</p> <ul style="list-style-type: none"> • EE AUC ↓ 45%³¹ • Norelgestromin AUC ↑ 83%³¹ <p>DMPA:</p> <ul style="list-style-type: none"> • DMPA AUC ↑ 46%⁴⁴ <p>Etonogestrel Implant:</p> <ul style="list-style-type: none"> • Etonogestrel AUC ↑ 52%⁵³ <p>Changes in ARV Levels and/or Effects on HIV</p> <p><i>Patch:</i></p> <ul style="list-style-type: none"> • LPV/r ↓ 19%³¹ <p><i>DMPA:</i></p> <ul style="list-style-type: none"> • No effect on HIV disease progression⁴⁴ • No change in LPV/r levels⁴⁴ 	<p>COC:</p> <ul style="list-style-type: none"> • Increased pregnancy rate, but CIs overlap⁵⁰ <p>Patch:</p> <ul style="list-style-type: none"> • No ovulations³¹ <p>DMPA:</p> <ul style="list-style-type: none"> • No pregnancies and no ovulations⁴⁴ • Increased pregnancy rate, but CIs overlap⁵⁰ <p>Etonogestrel Implant:</p> <ul style="list-style-type: none"> • No increase in pregnancy rate⁵⁰ <p>LN Implant:</p> <ul style="list-style-type: none"> • No increase in pregnancy rate^{42,50} 	No additional contraceptive protection is needed.	No additional contraceptive protection is needed.	No additional contraceptive protection is needed.	No additional contraceptive protection is needed.	<p>For COCs, nonsignificant increase in pregnancy rate. Small decrease in progestin level.</p> <p>For patch, no ovulations and progestin levels increased.</p> <p>For DMPA, evidence shows no effect on pregnancy rate or ovulations. Progestin levels increased.</p> <p>For implants, evidence shows no effect on pregnancy rate. Progestin levels increased.</p>
SQV/r	<p>↓ EE⁷¹</p> <p>Changes in ARV Levels and/or Effects on HIV</p> <p>COC:</p> <ul style="list-style-type: none"> • No change in SQV/r levels⁷² 	N/A	Can consider an alternative method (or a reliable method of barrier contraception) in addition to this method.	Can consider an alternative method (or a reliable method of barrier contraception) in addition to this method.	No additional contraceptive protection is needed.	Can consider an alternative method (or a reliable method of barrier contraception) in addition to this method.	<p>No information on progestin levels for CHCs or POPs.</p> <p>RTV inhibits CYP3A4, which may increase contraceptive hormone levels. However, some PI/r cause decreases in progestin levels, so there are theoretical concerns about contraceptive effectiveness.</p>

Table 3. Drug Interactions Between Antiretroviral Agents and Hormonal Contraceptives (page 5 of 8)

ARV Drug	Effect on Contraceptive Drug Levels and Contraceptive's Effects on ART and HIV	Clinical Studies	Dosing Recommendation/ Clinical Comment for COC/P/R	Dosing Recommendation/ Clinical Comment for POPs	Dosing Recommendation/ Clinical Comment for DMPA ^a	Dosing Recommendation/ Clinical Comment for Etonogestrel Implants	Justification/ Evidence for Recommendation
RTV-Boosted PIs, continued							
TPV/r	EE AUC ↓ 48% ⁷³ No significant change on NE. ⁷³ Changes in ARV Levels and/or Effects on HIV: • No change in TPV levels ⁷³	N/A	Can consider an alternative method (or a reliable method of barrier contraception) in addition to this method.	Can consider an alternative method (or a reliable method of barrier contraception) in addition to this method.	No additional contraceptive protection is needed.	Can consider an alternative method (or a reliable method of barrier contraception) in addition to this method.	For COCs, no significant change in progestin levels, but the only data available are from the product label. No data on POPs. RTV inhibits CYP3A4, which may increase contraceptive hormone levels. However, some PI/r cause decreases in progestin levels, so there are theoretical concerns about contraceptive effectiveness.
COBI-Boosted PIs							
ATV/c	Drospirenone AUC ↑ 2.3-fold EE AUC ↓ 22% ⁷⁴	N/A	Contraindicated with drospirenone-containing hormonal contraceptives due to potential for hyperkalemia. Consider alternative or additional contraceptive method.	No additional contraceptive protection is needed.	No additional contraceptive protection is needed.	No additional contraceptive protection is needed.	No data on POPs.

Table 3. Drug Interactions Between Antiretroviral Agents and Hormonal Contraceptives (page 6 of 8)

ARV Drug	Effect on Contraceptive Drug Levels and Contraceptive's Effects on ART and HIV	Clinical Studies	Dosing Recommendation/ Clinical Comment for COC/P/R	Dosing Recommendation/ Clinical Comment for POPs	Dosing Recommendation/ Clinical Comment for DMPA ^a	Dosing Recommendation/ Clinical Comment for Etonogestrel Implants	Justification/ Evidence for Recommendation
COBI-Boosted PIs, continued							
DRV/c	Drospirenone AUC ↑ 1.6-fold EE AUC ↓ 30% ⁷⁴	N/A	Clinical monitoring is recommended when DRV/c is used in combination with drospirenone-containing COCs, due to the potential for hyperkalemia. Consider alternative or additional contraceptive method.	No additional contraceptive protection is needed.	No additional contraceptive protection is needed.	No additional contraceptive protection is needed.	No data on POPs.
PIs without RTV							
ATV	COC: • EE AUC ↑ 48% ⁷⁵ • NE AUC ↑ 110% ⁷⁵	N/A	Prescribe oral contraceptive that contains no more than 30 mcg of EE or recommend alternative contraceptive method.	No additional contraceptive protection is needed.	No additional contraceptive protection is needed.	No additional contraceptive protection is needed.	For COCs, increased concentrations of estrogen and progestin, but the only data available are from the product label. No data on POPs.
FPV	COC APV: • No change in EE AUC; C _{min} ↑ 32% • NE AUC ↑ 18%; C _{min} ↑ 45% ⁷⁰ FPV with EE/NE: • APV AUC ↓ 22%; C _{min} ↓ 20% ⁷⁰	N/A	Use alternative contraceptive method.	Can consider an alternative method (or a reliable method of barrier contraception) in addition to this method.	Can consider an alternative method (or a reliable method of barrier contraception) in addition to this method.	Can consider an alternative method (or a reliable method of barrier contraception) in addition to this method.	Use of FPV alone with EE/NE may lead to loss of virologic response. No data on POPs.

Table 3. Drug Interactions Between Antiretroviral Agents and Hormonal Contraceptives (page 7 of 8)

ARV Drug	Effect on Contraceptive Drug Levels and Contraceptive's Effects on ART and HIV	Clinical Studies	Dosing Recommendation/ Clinical Comment for COC/P/R	Dosing Recommendation/ Clinical Comment for POPs	Dosing Recommendation/ Clinical Comment for DMPA ^a	Dosing Recommendation/ Clinical Comment for Etonogestrel Implants	Justification/ Evidence for Recommendation
PIs without RTV, continued							
IDV	COC: • EE AUC ↑ 22% • NE AUC ↑ 26% ⁷⁶	COC: • No pregnancies among women taking IDV and COCs ⁵⁶	No additional contraceptive protection is needed.	No additional contraceptive protection is needed.	No additional contraceptive protection is needed.	No additional contraceptive protection is needed.	For COCs, small increases in EE and progestin have been observed, and one clinical study did not suggest any efficacy concerns. No data on POPs.
NFV	COC: • EE AUC ↓ 47% • NE AUC ↓ 18% ⁷⁷ DMPA: • No change ³² NFV: • AUC ↓ 18%	COC: • One small study suggested that women using COCs and NFV may have had higher pregnancy rates than those using COCs alone. ⁵⁶ DMPA: • No pregnancies and no ovulations ^{32,55} • No change in CD4 count or HIV RNA ^{32,55}	Can consider an alternative method (or a reliable method of barrier contraception) in addition to this method.	Can consider an alternative method (or a reliable method of barrier contraception) in addition to this method.	No additional contraceptive protection is needed.	Can consider an alternative method (or a reliable method of barrier contraception) in addition to this method.	For COCs, a small decrease in progestin and a decrease in estrogen have been observed; one small clinical study suggested possible higher pregnancy rate with COC and NFV use. For DMPA, PK and clinical data demonstrate no change. However, NFV AUC slightly decreased. No data on POPs or implants.
CCR5 Antagonist							
MVC	COC: • No significant effect on EE or LN ⁷⁸	N/A	No additional contraceptive protection is needed.	No additional contraceptive protection is needed.	No additional contraceptive protection is needed.	No additional contraceptive protection is needed.	For COCs, no change in EE or progestin. No clinical data. No data on POPs.

Table 3. Drug Interactions Between Antiretroviral Agents and Hormonal Contraceptives (page 8 of 8)

ARV Drug	Effect on Contraceptive Drug Levels and Contraceptive's Effects on ART and HIV	Clinical Studies	Dosing Recommendation/ Clinical Comment for COC/P/R	Dosing Recommendation/ Clinical Comment for POPs	Dosing Recommendation/ Clinical Comment for DMPA ^a	Dosing Recommendation/ Clinical Comment for Etonogestrel Implants	Justification/ Evidence for Recommendation
INSTIs							
BIC/FTC/TAF	No significant drug interactions with EE or norgestimate.	N/A	No additional contraceptive protection is needed.	No additional contraceptive protection is needed.	No additional contraceptive protection is needed.	No additional contraceptive protection is needed.	No clinical data.
DTG	COC: • No significant effect on norgestimate or EE • No change in DTG AUC ⁴⁵	N/A	No additional contraceptive protection is needed.	No additional contraceptive protection is needed.	No additional contraceptive protection is needed.	No additional contraceptive protection is needed.	For COCs, no change in EE or progestin. No clinical data. No data on POPs.
EVG/c	COC: • Norgestimate AUC ↑ 126% EE AUC ↓ 25% ⁷⁹	N/A	No additional contraceptive protection is needed.	No additional contraceptive protection is needed.	No additional contraceptive protection is needed.	No additional contraceptive protection is needed.	When administered as the four-drug regimen EVG/c/FTC/TDF, increases in progestin and a small decrease in EE were observed. No clinical data. No data on POPs.
RAL	COC: • No change in EE • Norgestimate AUC ↑ 14% ⁸⁰	N/A	No additional contraceptive protection is needed.	No additional contraceptive protection is needed.	No additional contraceptive protection is needed.	No additional contraceptive protection is needed.	For COCs, no change in EE and a small increase in progestin. No clinical data. No data on POPs.

^a Because the hormonal levels achieved with DMPA are substantially higher than the levels that are required for contraception, any small reduction in hormonal level due to ARV drugs is unlikely to reduce contraceptive effectiveness.

Key to Symbols:

↑ = increase

↓ = decrease

Key: APV = amprenavir; ART = antiretroviral therapy; ARV = antiretroviral; ATV = atazanavir; ATV/c = atazanavir/cobicistat; ATV/r = atazanavir/ritonavir; AUC = area under the curve; BIC = bictegravir; **C_{12h}** = concentration at 12 hours post-dose; **C_{24h}** = concentration at 24 hours post-dose; CD4 = CD4 T lymphocyte; CDC = Centers for Disease Control and Prevention; CHC = combination hormonal contraceptives; CI = confidence interval; C_{min} = minimum plasma concentration; COBI = cobicistat; COC/P/R = combined oral contraceptives/patch/ring; CYP = cytochrome P450; DMPA = depot medroxyprogesterone acetate; **DOR= doravirine**; DRV/c = darunavir/cobicistat; DRV/r = darunavir/ritonavir; DTG = dolutegravir; EE = ethinyl estradiol; EFV = efavirenz; ETR = etravirine; EVG/c = elvitegravir/cobicistat; FPV = fosamprenavir; FPV/r = fosamprenavir/ritonavir; FTC = emtricitabine; IDV = indinavir; **INSTI = integrase strand transfer inhibitor**; LN = levonorgestrel; LPV/r = lopinavir/ritonavir; MVC = maraviroc; NE = norethindrone; NFV = nelfinavir; NNRTI = non-nucleoside reverse transcriptase inhibitor; NVP = nevirapine; P = progestin; PI = protease inhibitor; PI/r = protease inhibitor/ritonavir; PK = pharmacokinetic; POP = progesterone-only oral contraceptive pills; RPV = rilpivirine; RTV = ritonavir; SQV/r = saquinavir/ritonavir; TAF = tenofovir alafenamide; TDF = tenofovir disoproxil fumarate; **TPV = tipranavir**; TPV/r = tipranavir/ritonavir

Recommendations for the Use of Antiretroviral Drugs in Pregnant Women with HIV Infection and Interventions to Reduce Perinatal HIV Transmission in the United States

Table 3. Drug Interactions Between Antiretroviral Agents and Hormonal Contraceptives

Source: Panel on Antiretroviral Guidelines for Adults and Adolescents. [Guidelines for the Use of Antiretroviral Agents in Adults and Adolescents Living with HIV](#). Department of Health and Human Services. Tables 21a, 21b, and 21d.

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